

Claims

1. A display device comprising:

on a liquid-crystal-side surface of one substrate out of substrates which are arranged to face each other with liquid crystal therebetween, a region which is surrounded by a plurality of gate signal lines which are arranged in parallel to each other and a plurality of drain signal lines which are arranged in parallel to each other in a state that the drain signal lines intersect the gate signal lines defines a pixel region;

the pixel region includes a switching element which is operated in response to a scanning signal from the gate signal line, a pixel electrode to which a video signal from the drain signal line is supplied through the switching element, and a counter electrode which generates an electric field between the counter electrode and the pixel electrode;

the pixel region is constituted of divided respective regions; wherein

in one region, the counter electrode made of a light-transmitting material which is formed on the center except for a slight periphery of the region below an insulation film and the pixel electrode which is constituted of a group of electrodes which extend in one direction and are arranged in parallel to each other in the direction which intersects one direction above the insulation film in a state that the group

of electrodes are overlapped to the counter electrode are formed, and

in another region, the counter electrode which is constituted of a group of electrodes which extend in one direction and are arranged in parallel to each other in the direction which intersects one direction below the insulation layer and the pixel electrode which is constituted of a group of electrodes which extend in one direction and are arranged in parallel in the direction which intersects one direction above the insulation film and is arranged alternately with the counter electrode.

2. A display device comprising:

on a liquid-crystal-side surface of one substrate out of substrates which are arranged to face each other with liquid crystal therebetween, a region which is surrounded by a plurality of gate signal lines which are arranged in parallel to each other and a plurality of drain signal lines which are arranged in parallel to each other in a state that the drain signal lines intersect the gate signal lines defines a pixel region;

the pixel region includes a switching element which is operated in response to a scanning signal from the gate signal line, a pixel electrode to which a video signal from the drain signal line is supplied through the switching element, and a counter electrode which generates an electric field between the counter electrode and the pixel electrode;

the pixel region is constituted of divided respective regions; wherein

in one region, the pixel electrode made of a light-transmitting material which is formed on the center except for a slight periphery of the region below an insulation film and the counter electrode which is constituted of a group of electrodes which extend in one direction and are arranged in parallel to each other in the direction which intersects one direction above the insulation film in a state that the group of electrodes are overlapped to the pixel electrode are formed,

in another region, the pixel electrode which is constituted of a group of electrodes which extend in one direction and are arranged in parallel to each other in the direction which intersects one direction below the insulation layer and the counter electrode which is constituted of a group of electrodes which extend in one direction and are arranged in parallel in the direction which intersects one direction above the insulation film and is arranged alternately with the pixel electrode, and

each counter electrode in each region is formed in a state that the counter electrode covers the drain signal line.

3. A display device according to claim 2, wherein the respective insulation films formed in the respective regions are formed of a sequentially stacked body which is constituted of a protective film made of an inorganic material and a

protective film made of an organic material, and the respective counter electrodes are formed of a light transmitting material.

4. A display device comprising:

on a liquid-crystal-side surface of one substrate out of substrates which are arranged to face each other with liquid crystal therebetween, a region which is surrounded by a plurality of gate signal lines which are arranged in parallel to each other and a plurality of drain signal lines which are arranged in parallel to each other in a state that the drain signal lines intersect the gate signal lines defines a pixel region;

the pixel region includes a switching element which is operated in response to a scanning signal from the gate signal line, a pixel electrode to which a video signal from the drain signal line is supplied through the switching element, and a counter electrode which generates an electric field between the counter electrode and the pixel electrode; and

the pixel region is constituted of divided respective regions; wherein

in one region, the counter electrode which is formed on the center except for a slight periphery of the region below an insulation film and also functions as a reflective electrode and the pixel electrode which is constituted of a group of electrodes which extend in one direction and are arranged in parallel to each other in the direction which intersects one direction above the insulation film in a state that the group

of electrodes are overlapped to the counter electrode are formed, and

in another region, the counter electrode which is constituted of a group of electrodes which extend in one direction and are arranged in parallel to each other in the direction which intersects one direction below the insulation layer and the pixel electrode which is constituted of a group of electrodes which extend in one direction and are arranged in parallel in the direction which intersects one direction above the insulation film and is arranged alternately with the counter electrode.

5. A display device comprising:

on a liquid-crystal-side surface of one substrate out of substrates which are arranged to face each other with liquid crystal therebetween, a region which is surrounded by a plurality of gate signal lines which are arranged in parallel to each other and a plurality of drain signal lines which are arranged in parallel to each other in a state that the drain signal lines intersect the gate signal lines defines a pixel region;

the pixel region includes a switching element which is operated in response to a scanning signal from the gate signal line, a pixel electrode to which a video signal from the drain signal line is supplied through the switching element, and a counter electrode which generates an electric field between the counter electrode and the pixel electrode; and

the pixel region is constituted of divided respective regions; wherein

in one region, the counter electrode which is formed on the center except for a slight periphery of the region below an insulation film and also functions as a reflective electrode and the pixel electrode which is constituted of a group of electrodes which extend in one direction and are arranged in parallel to each other in the direction which intersects one direction above the insulation film in a state that the group of electrodes are overlapped to the counter electrode are formed,

in another region, the counter electrode which is constituted of a group of electrodes which extend in one direction and are arranged in parallel to each other in the direction which intersects one direction below the insulation layer and the pixel electrode which is constituted of a group of electrodes which extend in one direction and are arranged in parallel in the direction which intersects one direction above the insulation film and is arranged alternately with the counter electrode, and

the insulation film has a larger thickness in another region than one region such that a film thickness of a liquid crystal layer in one region is approximately three times as large as a film thickness of a liquid crystal layer in another region.

6. A display device according to claim 5, wherein the

insulation film in one region is formed of a protective film made of an inorganic material, the insulation film in another region is formed of a sequentially stacked body consisting of a protective film made of an inorganic material and a protective film made of an organic material, and at the same time, the counter electrode includes at least a counter electrode which covers the drain signal line.

7. A display device comprising:

on a liquid-crystal-side surface of one substrate out of substrates which are arranged to face each other with liquid crystal therebetween, a region which is surrounded by a plurality of gate signal lines which are arranged in parallel to each other and a plurality of drain signal lines which are arranged in parallel to each other in a state that the drain signal lines intersect the gate signal lines defines a pixel region;

the pixel region includes a switching element which is operated in response to a scanning signal from the gate signal line, a pixel electrode to which a video signal from the drain signal line is supplied through the switching element, and a counter electrode which generates an electric field between the counter electrode and the pixel electrode;

the pixel region is constituted of divided respective regions; wherein

in one region, the counter electrode which is formed on the center except for a slight periphery of the region below

an insulation film and also functions as a reflective electrode and the pixel electrode which is constituted of a group of electrodes which extend in one direction and are arranged in parallel to each other in the direction which intersects one direction above the insulation film in a state that the group of electrodes are overlapped to the counter electrode are formed,

in another region, the counter electrode which is constituted of a group of electrodes which extend in one direction and are arranged in parallel to each other in the direction which intersects one direction below the insulation layer and the pixel electrode which is constituted of a group of electrodes which extend in one direction and are arranged in parallel in the direction which intersects one direction above the insulation film and is arranged alternately with the counter electrode, and

the insulation film has a layer thickness thereof in one region than the layer thickness in another region.

8. A display device according to claim 7, wherein the insulation film in another region is formed of a protective film made of an inorganic material, and the insulation film in one region is formed of a sequentially stacked body consisting of a protective film made of an inorganic material and a protective film made of an organic material.

9. A display device comprising:

on one substrate out of a pair of substrates which are

arranged to face each other with liquid crystal therebetween;

pixel electrodes and counter electrodes are formed;
wherein

the display device includes transmissive regions and reflective regions, and

a distance from the substrate to an uppermost layer electrode is set larger in the transmissive regions than in the reflective region, and a planar distance between the uppermost layer electrodes is set larger in the transmissive regions than in the reflective region.

10. A display device according to claim 9, wherein the display device includes a counter electrode made of a transparent conductor which extends between the transmissive region and the reflective region, the display device includes a counter electrode made of metal which is formed in the reflective region, and the display device includes a pixel electrode formed of a transparent electrode which is formed on an uppermost layer and is spaced apart from the counter electrode by way of an insulation film.

11. A display device according to claim 9, wherein the display device includes a pixel electrode made of a transparent conductor which extends between the transmissive region and the reflective region, the display device includes a pixel electrode made of metal which is formed in the reflective region, and the display device includes a counter electrode formed of

a transparent electrode which is formed on an uppermost layer and is spaced apart from the counter electrode by way of an insulation film.

12. A display device according to claim 9, wherein a boundary between the transmissive region and the reflective region exists in the inside of the display region.

13. A display device according to claim 12, wherein the initial orientation direction is substantially parallel to the extending direction of the boundary between the transmissive region and the reflective region.

14. A display device according to claim 12, wherein the boundary between the transmissive region and the reflective region is covered with the uppermost layer electrode thus providing a normally black mode.

15. A display device according to claim 14, wherein the uppermost layer electrode which covers the boundary between the transmissive region and the reflective region sets a transmissive-region-side width thereof larger than a reflective-region-side width thereof.

16. A display device according to claim 15, wherein the uppermost layer electrode which covers the boundary between the transmissive region and the reflective region sets the width thereof larger than a sum of a distance between the uppermost layer electrodes in the transmissive region and a distance between the uppermost electrodes in the reflective region.

17. A display device according to claim 15, wherein the uppermost layer electrode which covers the boundary between the transmissive region and the reflective region sets the transmissive-region-side width thereof larger than a distance between the electrodes in the transmissive region and sets the reflective-region-side width thereof larger than a distance between the electrodes in the reflective region.

18. A display device comprising:

on one substrate out of a pair of substrates which are arranged to face each other with liquid crystal therebetween;

pixel electrodes and counter electrodes are formed;

wherein each pixel includes a first region in which both of the pixel electrode and the counter electrode extend in parallel linearly, and a second region in which one electrode out of the pixel electrode and the counter electrode is formed linearly, and another electrode is formed in a planner shape and is overlapped to one electrode by way of an insulation film.

19. A display device according to claim 18, wherein a distance between the linear electrodes differ between the first region and the second region.

20. A display device according to claim 19, wherein the distance between the electrodes is set larger in the first region than in the second region.